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Washington State Technology Transfer



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**Washington State
Department of Transportation**

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and the Local Technical Assistance Program (LTAP)

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Editor reserves the right to refuse to publish and to edit articles
to conform to the standards of our publication.

The opinions expressed in articles are not necessarily those
of the editor.

Cover photo: *This photo is of a Pierce County asphalt
distributor applying Rubberized Modified Binder during
their Rubberized Chip Seal project.*

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From the Editor's Desk

The Washington State Legislature approved \$1 million in their 2004 budget to support the *Safe Routes to Schools* Grant Program. The program is a coordinated effort between the Washington State Departments of Health and Transportation, the Washington Traffic Safety Commission, the Office of the Superintendent of Public Instruction, and the Bicycle Alliance of Washington (http://www.wsdot.wa.gov/bike/Safe_Routes.htm).

The program aims to protect children from traffic deaths and injuries, and promotes a healthy lifestyle through biking and walking. It also provides sensible transportation by reducing the number of car trips to and from schools. More than 60 proposals were received during a three-week call for projects. A common component in all eleven of the projects selected is community involvement in the development of safety, education, enforcement, and/or traffic improvement programs to get more kids walking and biking to school safely. We appreciate the continued support for this program.

On another note, I would like to offer my congratulations to Bellingham, Covington, Federal Way, Kittitas County, King County, Skagit County, Olympia, Sequim, and Yakima, who have joined thirty other communities across the state in using roundabouts for intersection control. Lacey and University Place have built the most roundabouts, with eight and seven respectively. Roundabout intersection control has been an option in this state since the mid 1990s. It is good to see communities venture into this new form of intersection control, and citizens give "innovative" communities positive feedback once they see how well roundabouts can work. This safety and operational technology will likely play a major role in lowering the number of collisions in this country as more communities elect to look outside traditional forms of traffic control.

As this edition goes to print, I must confess that the awakening of Mount St. Helens has given me new energy. Many of us here in the Northwest thought that the mountain gave us a "once in a lifetime opportunity" to see nature at work when it erupted in 1980, but thanks to technology and what scientists have learned in the last 24 years, the next generation is as fascinated by what is happening as many of us were in 1980.

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The Local Technical Assistance Program (LTAP) is a national program financed by the Federal Highway Administration (FHWA) and individual state transportation departments. Administered through Technology Transfer (T2) Centers in each state, LTAP bridges the gap between research and practice by translating state-of-the-art technology into practical application for use by local agency transportation personnel.

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Washington State
Department of Transportation



U. S. Department of Transportation
Federal Highway Administration

Improving Patch Joint Bond Strength

A rough surface texture introduced by one innovative alternative appears to have clear advantages over the saw-cut method of asphalt removal.

*By W. Spencer Guthrie, Ph.D.,
and Keith Woffinden*

Traditionally, asphalt concrete that must be removed because of deterioration or utility work is saw-cut and excavated with a backhoe. But the process of breaking the asphalt into manageable pieces for hauling can be time-consuming and laborious. Also, the smoothly cut vertical faces of the original pavement then offer minimal mechanical interlock with the patch material.

Increased mechanical interlock between patch materials and original pavement can improve patch performance by reducing joint faulting. The extent to which patch bond strength can be improved by the introduction of a rough surface texture, such as that developed by Pleasant Grove, Utah-based Asphalt Zipper, has not been previously investigated. Therefore, in cooperation with the firm, researchers in the Department of Civil and Environmental Engineering at Brigham Young University (BYU) in Provo this spring conducted an experiment to compare the bond strengths of saw-cut and “zipped” patch joints.

Experimental Methodology

Using the testing yard at Asphalt Zipper’s headquarters, the team made a saw cut some 75 feet in length through a 6-inch layer of asphalt concrete. The Asphalt Zipper Model 480S was then mounted to a loader and used to make a 48-inch-wide cut about 8 feet from the saw-cut edge.

All of the asphalt between the saw cut and the outer “zipped” edge was then removed. This configuration ensured that the adjacent asphalt concrete and the underlying base materials at both joint locations were as similar as possible. A tack coat was then sprayed onto both vertical cut faces, and a hot-mix asphalt patch was placed and compacted in the trench by a local paving contractor. The patch material was an AC-20 with a maximum aggregate size of ½ inch. The asphalt cement content was 5.5% by weight of total mix.

A month later, researchers removed 25 cores from each patch joint, where each core was centered as closely as possible on the respective joint. A portable 6-inch-diameter core drill was used for the extractions. The cores were then prepared for testing at the BYU Highway Materials Laboratory where each specimen was trimmed using a masonry saw to create flat, parallel end faces. The heights, weights, and bond areas of the cores were then measured.

Researchers sheared each core at a constant strain rate of 0.05 inch per minute with a testing apparatus specially manufactured for use in an MTS machine. The load was applied across the joint in the direction parallel to the longitudinal axis of the core. Joints were carefully aligned within a 1-inch shear zone provided in the testing apparatus to accommodate variability in joint locations.

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Each core was then loaded to failure at room temperature, then the bond strength was calculated for each specimen by dividing the maximum sustained load by the bond area over which the load was applied.

Test Results

Of the original cores, 20 Asphalt Zipper cores and 21 saw-cut cores were analyzed. The others were either damaged during laboratory preparation or not correctly centered on the joint. The average bond strength and standard deviation for the Asphalt Zipper cores was 10,086 psi and 3223 psi, respectively, while the saw-cut cores measured 8426 psi and 2986 psi, respectively. Therefore, according to this research, the strength of the Asphalt Zipper cores was 19.7% higher than that of the saw-cut cores.

In empirical research, replications are necessary to improve the accuracy of the average sample response by reducing its variation from the "true" value, or population mean. The population mean in this research would be determined by coring 100% of a given joint and computing the average bond strength from all of the specimens. While cost and other constraints typically prohibit such extensive analyses, information about populations can be inferred from sample data. The more samples, the more reliable the average sample response.

To determine whether this study reliably represented the population means, a two-sample "t-test" was performed, wherein the saw-cut and Zipper cores were each considered samples of separate populations. The t-test allows comparison of two population means while controlling the probability of making a Type I error.

A Type I error is committed upon rejection of a true null hypothesis in favor of a false alternative, where the null hypothesis is the postulation that the population means are equal and the alternative is the conjecture that one mean is larger than the other. The probability of occurrence for a Type I error is denoted by the symbol α , which is selected by the researcher as the tolerable level of error for the given experiment.

The value of α is compared to the level of significance, or p-value, computed from the sample data in the t-test, where the p-value represents the probability of observing a sample outcome more contradictory to the null hypothesis than the observed sample result. When the p-value is less than or equal to α , the null hypothesis can be rejected, leading to acceptance of the alternative hypothesis. However, when the p-value is greater than α , one must conclude that insufficient evidence exists to reject the null hypothesis.

The null hypothesis in this research was that the average population bond strengths of the saw-cut and "zipped" joints were equal, and the alternative hypothesis was that the Zipper joint had a higher average population bond strength than that of the saw-cut joint.

Analyses were conducted using a standard error rate of 0.05. At this level, only a 5% chance existed for falsely claiming that the two joint treatments were significantly different. After the data were checked to ensure compliance with statistical test requirements, the t-test was performed using a pooled standard deviation and yielded a p-value of 0.047.

Because the p-value is less than the selected value of α , one can conclude that sufficient sample evidence exists to reject the null hypothesis and accept the alternative. Therefore, in asphalt similar to that used in this experiment, the scarification imparted to vertical cut faces by the Asphalt Zipper can reasonably be expected to improve patch bond strength better than the saw-cut method of asphalt removal.



—Guthrie is an assistant professor in the Department of Civil and Environmental Engineering at Brigham Young University. Woffinden is an undergraduate student and research assistant.

Pierce County's Rubberized Chip Seal Project

*By Bob Brooks, WST2 Pavement Technology Engineer,
Washington State Department of Transportation (WSDOT)
Highways & Local Programs (H&LP) WST2 Center*

On August 16, 2004, Pierce County's Road Operations division experimented with their first rubberized chip seal project. The one-mile project took place on 104th Street SE, between Vickery Avenue E and Canyon Road E. The 39-foot-wide, two-lane minor arterial road required three passes of the paving train to complete the seal. The project was accomplished using the county's equipment and personnel in a well-organized operation. A standard chip seal (control section) was put down on a ½-mile section of the same road adjacent to this project so that a direct comparison could be made between the performances of the two adjacent sections.

This segment of 104th Street E was a good candidate for this project. Surface condition ratings ranged between 65 and 75, and preparation on the 4,300 + ADT arterial included crack sealing, localized distress repair, and sweeping. The chip seal utilized ¾-inch #10 rock that had been washed and pre-coated with paving-grade oil at the City of Tacoma's batch plant. A rubber modified PG64-22 oil was used on the pavement surface with a shot rate of approximately 0.38 gal./sq. yd. The oil was applied at a temperature of about 300 degrees F and allowed to cool to around 170 degrees F before placement of the rock chips. This required the chip spreader to stay back 50 to 75 feet behind the distributor. The pre-coated chips were applied at a rate of approximately 14 to 15 pounds/sq. yd.

Immediately after placing the rock, two pneumatic tired rollers followed with several passes to seat the rock. Sweeping followed the rollers with little rock pick-up experienced, and an estimated loss rate of 8 percent. After the initial sweeping, the road was opened to slow speed traffic. It performed well, providing turning movements were restricted.

The ¾-inch minus rock provides a nice, fairly smooth driving surface for the road users. Pre-coating the rock eliminates the need for a fog seal and gives that aesthetically pleasing black color that the public demands, and provides better visibility for the striping.

The pre-coated rock and rubberized asphalt binder added about \$0.12 sq. yd. to the cost of the project. Costs for this project averaged about \$1.10 per sq. yd., but considering the faster construction time and better rock retention rate, this seems like a reasonable expense. The county plans to monitor these sections and provide updated performance information periodically.

If you want to learn more about this process and how it performs, you can use the following contact information:

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Spreading the precoated rock.



Rubber Modified Binder Application.



Spreading the precoated rock.



Rolling to seat the rock.



Sweeping the loose rock.



The finished product.

LTAP: A Primer

*By Michele Regenold, Webmaster/Editor
Center for Transportation Research and Education
(Iowa LTAP), Iowa State University, Ames, Iowa*

Maybe you've been reading about a new technique for resurfacing streets. Maybe you've got a few new people on your staff who need some training related to street maintenance and roadwork safety. Or maybe you'd just like to get an engineer's opinion about a problem. Where can you turn? To your Local Technical Assistance Program (LTAP).

Each state has an LTAP, including Puerto Rico (and for tribal governments there are regional Tribal Technical Assistance Programs, or TTAP). The primary mission of LTAP/TTAP is to help local transportation providers improve their knowledge and skills through training, technical assistance, and technology transfer.

LTAP's services are a bargain. They're free or low-cost, including training workshops. Workshops are often held at locations throughout the state to help agencies keep their travel costs down. Some training can even be brought to your door. Many LTAPs have a safety circuit rider on staff. This safety trainer travels throughout his/her state providing on-demand workshops in agencies' own shops and offices. Some LTAPs are also exploring distance training options such as video conferencing and online courses.

The Roads Scholar program is another free service of many LTAPs. It offers a structured curriculum of transportation-related training with periodic recognition and rewards for individuals achieving various levels of training.

To get resources for your agency's in-house training or to bone up on a transportation-related subject, contact your LTAP's librarian coordinator. Each LTAP runs a transportation library with publications and videos for loan. The librarian can make suggestions about resources for training as well as locate the materials you need or refer you to someone who can help. To find out what materials a library has, you can request a library catalog or look on the Internet. Many LTAPs have their library catalogs online. The Illinois LTAP is going one step further. It has started to digitize some non-copyrighted videos and will be making them available as streaming videos from their website.

To learn about new library acquisitions, upcoming training events, and new techniques and materials for transportation-related maintenance and construction, get on your LTAP's mailing list for its free quarterly or bimonthly newsletter. The newsletters are written specifically for people maintaining city streets and county roads.

To find out more about your state's LTAP, you can look it up online via the national LTAP organization's website: www.ltapt2.org. Give your LTAP a call. They'd love to help.

Alternatively you could contact your local APWA chapter. Many local chapters already have partnerships with their LTAP to offer joint training and share resources. In fact, APWA and LTAP have an agreement to encourage the formation of these local partnerships. Fostering a safe, efficient, environmentally sound transportation system is APWA's and LTAP's common goal.



*Michele Regenold can be reached at (515) 296-0835.
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The Value of Training

Summary by Steve Muench, Ph.D. PE, of a chapter in his Ph.D. dissertation, University of Washington, 2004. For more information, please contact <stmuench@u.washington.edu>.

Knowledge is a vital organizational asset. This is the essential unstated assumption associated with almost all training discussions. While American corporations spend in excess of \$50 billion annually on training (Galvin, 2002) and numerous authors espouse the virtue and necessity of training, few make an effort to actually show its value. This short paper highlights the fundamental premise for continued and even increased support for training: it is an investment in a valuable commodity that produces high returns.

Knowledge is Valuable

Today, in the information age, organizations are routinely valued not on their physical but rather their intellectual capital. Edvinsson and Malone (1997) define intellectual capital as “the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide [an organization] with a competitive edge in the market.” Bassi and Van Buren (1999) point out that “intellectual capital is the only source of competitive advantage within a growing number of industries.” For instance, the \$296 billion market value of Microsoft in June 2004 far exceeds the value of its physical assets. To be sure, much of this value is based on speculation, but much is also based on Microsoft’s intellectual capital—what it knows.

Training is one of the chief methods of maintaining and improving intellectual capital. Because of this, an organization’s training can affect its value. Bassi and Van Buren (1999) found training as a percentage of payroll to be significantly correlated with the market-to-book value of publicly traded companies. Where the average U.S. employer spent about 0.9% of payroll on education and training (Bassi, et al., 1996), training magazine’s top 100 companies [in terms of training] averaged 4% with Pfizer ranking first at 14%.

Training is an Investment

General accounting standards classify training as an expense. However, training is really an investment: an organization typically invests up-front to train its employees (in the form of enrollment fees, travel expenses and opportunity cost of the employee’s time) and, in return, expects future returns (in the form of increased knowledge, skills and productivity). As with any other investment, if the returns outweigh the investment, training is a worthwhile endeavor.

Training is also an investment from the employee’s perspective. Training increases skills and knowledge, which can lead to better pay or promotion. So who benefits most from the training investment: the employee with increased wages and/or promotion, or the employer with increased productivity? Loewenstein and Spletzer (1998) researched this question and concluded, “the effect of an hour of training on productivity growth is about five times as large as the effect on wage growth.” Therefore, employers “reap almost all the

returns to company training” (Bartel, 2000). This may be oversimplifying because employees generally view training as either a gift from the employer or at least a sign of commitment on the part of the employee, which is important to job satisfaction (Barrett and O’Connell, 2001).

In sum, both the employee and employer benefit from the training investment. The question now shifts to one of measurement: do the returns on training outweigh the investment?

Training Return on Investment (ROI)

When calculated using sound methodology, training has been shown to provide significant return on investment: on the order of 5 to 200 percent. The problem is that methods used to quantify training ROI can often be suspect or even outright self-promotion. Furthermore, it is often very difficult to quantify the effects of training. For instance, one effect of training can be increased job satisfaction, which is difficult if not impossible to quantify. Intuitively we know this is important in retaining good employees; however it will not show up on a ROI calculation.

In 2000, Bartel provided one of the best objective looks at the value of training to the employer. She looked at 10 large data set surveys and 16 individual case studies in an attempt to determine the employer’s return on investment for employee training. She found the following:

- Methods using large data sets to compare many different organizations estimated training ROI from 7 to 50 percent.

■ Individual case studies estimated training ROI from 100 to 5900 percent. Bartel believes the high ROIs in this category are based on faulty methodology. Her in-depth analysis of two well-constructed internal case studies revealed a 100 to 200 percent ROI.

Therefore, even the most conservative estimate puts training's ROI at 7 percent—an acceptable rate of return by most standards. Additionally, although it is not appropriate to generalize based on the results of two case studies, it can be said that based on Bartel's in-depth analysis of two well-constructed internal case studies, training's ROI can be much higher: approaching 100 to 200 percent.

Summary

Training is a valuable commodity that, if viewed as an investment rather than an expense, can produce high returns. While it is

true that training costs money and uses valuable employee time and resources, studies tend to show training provides a positive return on investment—sometimes in the neighborhood of several hundred percent. Therefore, although training might seem like a luxury expense in tight financial times, it is, in fact, one of the most sure and sound investments available.

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Keeping the Street from Crumbling Until You Get That Next Grant

By Jim Seitz, Transportation Specialist
Association of Washington Cities

Traveling around the state while visiting cities, I get first-hand knowledge of the condition of our city streets. Although most cities are now using some kind of pavement management system, there simply is not enough funding to apply preventative maintenance on all of their streets at the optimal time. Unfortunately, deferred maintenance has become the norm, and backlog of needed improvements continues to grow. The City of Seattle alone has recently reported a total backlog of \$316 million, and they will need a dramatic increase in funding to keep this amount from growing to \$547 million over the next 20 years.

Rather than dwelling on funding, or lack thereof, I would like to invite cities to learn some of the proper basic techniques of street maintenance activities such

as crack sealing and pot-hole patching. Sometimes we overlook these basic activities that, when done properly, can help keep those streets from crumbling.

This summer and fall, I have been working with a consultant in developing a training course for city maintenance workers and supervisors. The course covers factors that affect pavement life, the basics of pavement structure, when to do a permanent repair versus the band-aid approach, and of course will cover the first line of pavement maintenance: crack sealing and pot-hole patching. At the date of this publication, we will have had three workshops conducted in Eastern Washington and hope to offer more training around the state. If you are interested in learning more about the workshop or would like to attend a future one, please contact me at (360) 753-4137 or jims@awcnet.org.



Context Sensitive Solutions: A Collaborative Process for Planning, Design, and Construction

*By John Lazzara, P.E.,
and Louis Arrigoni, P.E.*

Context Sensitive Solutions (CSS), also known as Context Sensitive Design, was first introduced to the transportation industry in 1998 by the Federal Highway Administration (FHWA). It is a concept that emphasizes the importance of early and continued public stakeholder involvement. The emergence of CSS indicates that government leaders recognize the significant role that transportation plays in everyday quality of life. CSS is fast becoming a critical component of a successful project development process—beginning from early planning, continuing through detailed engineering design, and carrying through to completion of the construction of a project.

Defining the Process

CSS focuses on supplementing traditional engineering standards; it is finding a balance between traditional engineering guidelines and community interests. Engineers and planners still must focus on historically common themes such as safety, mobility, environmental resource preservation and community input. However, with a stronger emphasis on public involvement through a commitment to “early and often” public coordination activities, safe transportation solutions can be designed in harmony with the community.

In the past, citizen advisory committees have been used to gather input and help provide direction during the planning stage for transportation projects. Once project improvements were approved, the public involvement process often stopped. As projects progressed to design and construction, changes might be needed as a result of new or more detailed information. The CSS process allows the flow of information to continue throughout the lifespan of a project by establishing continued citizen advisory committees and interactive project websites.

Motivation for CSS

Connecting the country by means of building highways was the primary focus of transportation in the 1950s and 1960s. With this monumental task substantially completed, transportation in the United States has moved into a new era. There is much less need for major new interstate construction. The attention now has shifted from providing access between city centers to improving quality of life. It is no longer just about building roads to move cars and trucks as quickly as possible. Projects are driven by increased expectations for better, safer facilities that not only serve specific transportation needs but also enhance the overall traveling experience. Visual and

aesthetic features are more important to project stakeholders, who often include local elected officials as well as community residents. The relatively recent trend of designating scenic highways and byways is an example of the significance that CSS has in today’s society.

Because of improvements in the way information is gathered and distributed, the public is better educated, more organized and more demanding when it comes to transportation projects. This general trend is evidenced in other aspects of everyday life as well, such as education and sports. Parents want more information and more involvement with the activities of their children. Similarly, CSS is a philosophy that has been adopted by many states in response to an ever-increasing public desire to have additional opportunities for input into the design of projects that affect their daily lives.

Although a more extensive public outreach program with meaningful input might lengthen the planning stage, by establishing buy-in from key stakeholders CSS can lead to successful consensus building. State departments of transportation (DOTs) that have investigated CSS have embraced the approach, finding that it can decrease the overall time of moving a project from initial concept stage to final construction.

Transportation leaders have realized that it is critical to keep the public involved in not only the planning process but also during design and construction. When special interest groups and the public are involved in the CSS process throughout the entire project, delays due to potential lawsuits are limited. CSS also helps create a sense of community and fosters pride in transportation projects by placing a stronger emphasis on environmental concerns and interactive public involvement.

DOTs Develop CSS Policies

Context-sensitive projects recognize and embrace community goals and are designed, built and maintained to be sustainable while minimizing disruption to the community and the environment. This new emphasis for transportation projects started in 1988, when the American Association of State Highway and Transportation Officials established the National Highway System Task Force to look beyond the completion of the interstate system. FHWA produced the "Flexibility in Highway Design" guidance in 1997, which took the first steps in providing direction for appropriate application of design details and criteria given an emphasis on community considerations. A 1998 conference, Thinking Beyond the Pavement: National Highway Workshop on Integrating Highway Development with Communities and the Environment While Maintaining Safety and Performance, held in Maryland led to a pilot program for CSS. Five state DOTs participated in this inaugural program; Connecticut, Kentucky, Maryland, Minnesota and Utah. Common themes are apparent with each state's approach of stressing the need to use collaborative, multidisciplinary teams with active and consistent public involvement.

FHWA set a goal for each state to develop a policy on CSS by the end of 2007. Transportation agencies across the country have been addressing the issue of CSS in varying degrees for the past six years. In Illinois, for example, House Bill 3061 and Public Act 93-0545 (enacted August 19, 2003) were passed by the Illinois General Assembly to move the state toward implementation of a CSS approach to its transportation program.

Through a process similar to the principles of CSS itself, the Illinois Department of Transportation (IDOT) used a multi-functional committee of transportation professionals to develop CSS policy for the state. IDOT also organized public involvement workshops aimed at educating participants in the process. Documents such as Maryland's "When Main Street is a State Highway" and the "NCHRP Report 480 – Best Practices of CSS" provide samples for good stakeholder involvement and flexible approaches to design. The Illinois policy is envisioned as a statement on CSS that will lead to training and continuing education opportunities for the engineering community and the general public.

Basics of CSS

The 1998 Thinking Beyond the Pavement workshop established these seven core principles of CSS, called the Qualities of Excellence in Transportation Design:

- Satisfies the purpose and needs
- Safe facility
- In harmony with the community
- Exceeds the expectations of both designers and stakeholders
- Efficient and effective use of the resources
- Minimal disruption to the community
- Provides added lasting value

Additionally, there are eight Characteristics of the Process Contributing to Excellence:

- Communication—early and continuous
- Multidisciplinary team
- Full range of stakeholders
- Process is tailored to meet the circumstances
- Top-down commitment to the process
- Tailored public involvement process
- All elements of project understood initially
- Full range of tools for communication

Illinois, Other States Continue Forming CSS Policies

The CSS concept has received favorable response from people in Cook County, Ill., where engineers are planning a new connection between Interstate Route 294 and Interstate Route 57. Several sensitive environmental resources are located within the project area, including floodplains, wetlands and Section 4(f) properties, as well as an environmental justice area with low-income housing. An extensive alternative evaluation process was conducted that developed and evaluated more than 28 concepts for arranging the proposed interchange ramps.

Comprehensive public involvement began with a series of early public workshops that clarified local travel desires and solicited input on the various interchange concepts. The workshops were held in cooperation with the Southwest Interstate Corridor Planning Council and included representation from the general public, local industry and community leaders. A parallel series of workshops were conducted with representatives from the Illinois

State Toll Highway Authority, IDOT and FHWA, forging a cooperative effort to review progress on the development of geometric design and operational analysis work.

As the project advances to the next phase, the community and agency workshops will continue to be a forum for the interactive and supportive exchange of ideas.

Although few states currently have official policies or guidelines on implementing CSS, more than half of them are moving in that direction with strategic documents expected to be completed in 2004. Many recognize the significant role that CSS can play in making transportation planning, design and construction projects successful

legacies for future generations. The commitment to follow through on established CSS policies is a top-down process. The five states that participated in the initial CSS pilot program showed that when state DOT leaders dedicate resources and stress the importance of continual public involvement, transportation projects routinely achieve a higher level of public acceptance.

John Lazzara, P.E., can be reached at HDR's Chicago, Ill., office at (773) 380-7938, fax (773) 380-7979 or e-mail john.lazzara@hdrinc.com

Louis Arrigoni, P.E., can be reached at HDR's Chicago, Ill., office at (773) 380-7936, fax (773) 380-7979 or e-mail lou.arrigoni@hdrinc.com

This article was reprinted with permission from the May 2004 issue of Transportline, a technical publication of HDR.

Editor's Note: WSDOT also implements the CSS policies and is now implementing them by Executive Order, signed by Secretary of Transportation Doug MacDonald. More information can be found at <http://www.wsdot.wa.gov/biz/csd/wsdot.htm>. WSDOT and Highways and Local Programs T2 Center is offering CSS training this fall and winter to WSDOT and Local Agency personnel. See the training section of this newsletter or visit the WST2 website at <http://www.wsdot.wa.gov/TA/T2Center/Training/CSS.pdf> for more information.



Retired Professionals: Ready to Work for You

Need help with a special project? Need the skills and experience of a public works professional? The Washington State Department of Transportation Highways & Local Programs' WST2 Center's database of Retired Professionals may be just what you need. It is a skills bank of professionals with expertise in maintenance, operations, engineering, inspection, construction, and surveying, just to name a few. You can browse through the listings from the T2 home page:

<http://www.wsdot.wa.gov/TA/T2Center/T2hp.htm>
Click on Retired Professional Program

We would like to increase the awareness of this program. We encourage you to tell your staff and soon-to-be-retired employees about this program. We would like to see this skills bank grow and become a strong, extensive, and useful resource for agencies when there is a need for outside professional help.

Are you retiring soon? Want to continue with part time, full time, or occasional employment? You can now enter your resume directly online by going to:

http://fmapps.wsdot.wa.gov/retired_professional_reviewer

Enter all of your information and give yourself a Retiree Identifier that will allow you, and only you, to return at another time to make changes to your record. Then, click the register button. A window will pop up asking for a User ID and Password. You should enter:

User ID: retired

Password: kindof

This will be the only time you enter the User ID and Password.

Your resume will be sent to Laurel Gray for review and posting to the web. If you prefer, you can access the first website above for a hard copy of the form to send to the WST2 Center.

If you have questions, contact Laurel Gray at (360) 705-7355 or GrayL@wsdot.wa.gov.

A good program should...

By Tim Ard

What makes up a good training program? How much time and money do you invest in the class? In training employees? In making training profitable to those attending? If you are an attendee, what should you plan on doing with the information?

A few months back, I had a class where about half of the attendees were worn out from long work hours the day and night before. It was frustrating to say the least just trying to keep them all awake. I was praying it wasn't a reflection on my class presentation, you know, putting them to sleep.

In an attempt to set an example, I called on a fellow that had his eyes closed for about three-quarters of my segment on saw chain. I saw him open one eye briefly, so I called him to a challenge. I asked him to give me the five parts of the saw tooth. He set up in his chair and proceeded to give me all five and the angles. Perfect job he did! I thought I had surprised him. I was sure he was asleep. He wasn't. Well, it sure surprised me! He evidently learned using the third scenario below.

After the class, I couldn't help but to think about what I had learned from this scenario. Three distinct patterns I see when training/teaching all people.

1. People learn by reading, taking notes, and reviewing. This is a great way for some folks. It is often a little short sighted, not for mechanical things, but okay for planning and doing things

of risk. It's hard to read a manual on driving a truck or saw and then be able to drive it ... safely and productively.

2. People learn by watching. Some folks can watch a task performed by another person and it's like, "wow, I can do that." And they do. Again though, it's tough to approach hazardous tasks safely and productively.
3. People learn by listening. Some folks can listen to a speaker or audible presentation and they retain it. Very tough to use this technique only ...

In all three scenarios, the actions of reading, watching, and listening are part of a great training class. A training program however, includes another very important aspect to make it profitable to those attending. There must be repetition.

A good training program repeats the information, the demonstration and the listening to make it stick. The way we learn is doing something over and over and over ... read, watch, listen ... over and over.

Make sure your safety and productivity training is not just a scenario. Make sure it's a defined program. If you need to discuss this further ... contact us, contact us, contact us at Forest Applications Training, Forest Applications Training, Forest Applications Training.

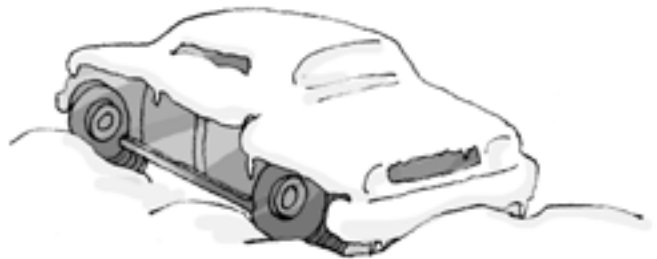


Reprinted with permission from Forest Applications News, First Quarter, 2004.

Winter Driving Tip

By Dave Sorensen, Traffic Technology Engineer,
WSDOT Highways & Local Programs

You've seen them. They're out there. Are you one of them? The drivers that just don't have time to let the car defroster finish its job before getting on the road. They are easy to recognize with only a dinner plate sized spot of their windshield defrosted. Obviously, with such limited visibility, this is a very dangerous way to drive. Well, if you are one of those drivers, here's a tip: **before you drive, fold your sun visor down close to the windshield and turn the defroster on.** Doing this creates a dam, trapping the warm air from your defroster against the glass and dramatically reducing the defrost time.



Bellingham Roundabout

In that last issue of the WST2 Newsletter (Summer 2004), we asked readers to keep an eye out for more information on an intersection improvement that was related to the cover photo. The following article and photo are the result of an intersection that went from a four-way stop to a multi-lane or "double-lane" roundabout.

The city of Bellingham opened its first roundabout on Tuesday, September 21, at the intersection of Cordata Parkway and Kellogg Road. The intersection, prior to the roundabout, was a poorly functioning four-way stop that created significant delays as students and staff of adjacent Whatcom Community College (WCC) (approximately 7,000 students) were driving and walking to and from the campus. A ribbon cutting event at the roundabout celebrated the great partnership between the city, the college, WSDOT, and the designers of the project, Reid Middleton, Inc., of Everett, Washington.

The wide intersection, traffic movements, and the previous traffic control consisting of stop signs made this an ideal spot for a roundabout. Roundabouts provide better levels of service by reducing delay, and provide better safety for all users including pedestrians. Pedestrian crossings at the roundabout provide shorter crossing distances and greater convenience than what was present before construction.

The City of Bellingham, and their partners, went through a lengthy public relations process which included at least one open house and a special session with city law enforcement to convey the current laws in place that would be needed to enforce the intersection. Lane control signs are in place at the roundabout to minimize the number

of conflicts that are inherent in the more complex multi-lane roundabout. Landscaping and the maintenance of this college gateway were implemented with an agreement that college staff will maintain the necessary foliage that is planted in the gateway.

This roundabout will be part of a national study by the Insurance Institute of Highway Safety (IIHS). It is examining drivers' perception before the roundabout was built and three to four months afterward. Many roundabouts have not survived the public input

process because of misperceptions of what a roundabout is and isn't. Other studies have shown a negative attitude toward the roundabouts before they were built, and begrudging acceptance after a driver gets a chance to experience them even though travel time and convenience are

improved by the new roundabout intersection.

The roundabout, as noted by the mayor in a presentation officially opening the roundabout, functioned "remarkably well" and will be a great replacement to the less than satisfying four-way stop. Two bus pullouts were built just south of the roundabout to serve the increasing number of students who ride buses to and from the WCC campus. Another roundabout is designed and will be built in spring of 2005 just to the south of the current roundabout, enabling the city to save street widening costs between the roundabouts. This will be an example of the planning concept, "wide nodes, narrow links." Congratulations, Bellingham, on a great project!



The Washington State Department of Transportation Announces the 2004 Crystal Mouse Award Winners

Congratulations to the three Crystal Mouse Award Winners at the 2004 Pacific Northwest Transportation Technology Expo!

WSDOT Eastern Region Colfax maintenance team's Guidepost Hole Punch was voted best equipment modification presented at the expo and WSDOT South Central Region Walla Walla maintenance team's Guardrail Sign Mount was voted the best tool presented at the Expo. The WST2 Advisory Committee judged the WSDOT Olympic Region Shelton maintenance team's Asphalt

Patching Grader Attachment the best mousetrap published in the WST2 newsletter during the year 2003. Chris Christopher, State Maintenance Engineer, and Brian Walsh, Highways and Local Programs Technical Services Manager, presented the awards to the winners during a Transportation Commission meeting on September 16, 2004.

Guidepost Hole Puncher

The Best Equipment/Equipment Modification at the Pacific Northwest Transportation Technology Expo 2004

WSDOT Eastern Region, Colfax Maintenance Shop

Maintenance Superintendent: Jay Miller
Maintenance Supervisor: Larry Batterton
Lead Technician: Bob Taylor
Maintenance Technician II: Tony Roberts

Carsonite Delineator guideposts, which are installed to mark the edge of paved roadways as a visual aid for the traveling public, were being installed manually, using fence post driver-type installation devices such as slide hammers that were available commercially. Each delineator must be set into the ground approximately 18 inches deep. Road shoulder soils are rocky and compacted, and sometimes they are surfaced with asphalt or other barriers, making installation extremely difficult. Sometimes the crew used a jackhammer to make a pilot hole, then inserted a guidepost into the pilot hole and tamped the ground around it. Using this methodology, a two-man crew could install only 10 to 20 posts per day.



Tony Roberts, Larry Batterton, Bob Taylor, and Jeff Vitamanti.



Guidepost Hole Punch was voted best equipment modification.

They wanted to develop a tool that would quickly and effortlessly make a pilot hole to speed up installation operations. Their concept was to make a tool

that would attach to the stinger of a backhoe-mounted jackhammer. After receiving permission to test their concept, they quickly built a penetrating tool and rented a bobcat with an overhead arm. The first tests worked, and the crew was soon able to dramatically increase the quantity of guideposts they could install. By using this equipment and changing to a three- or four-man crew, they are now able to install between 5 and 7 miles of equally spaced, straight guideposts per day, and average less than 2 minutes per post. They note that the guideposts are set at a consistent height now, too, so they look much better than before.

They built the prototype unit from scrap materials using shop resources; estimated cost of purchased materials was less than \$200. Materials used: a jackhammer spade, Selby tubing, chain, and some half-inch plate. It took about two days of testing and modification to develop a working prototype.

For more information, contact Robert Taylor, WSDOT Eastern Region, Colfax, Washington, at (509) 324-6581.

The Guardrail Sign Mount

The Best Tool at the Pacific Northwest Transportation Technology Expo 2004

WSDOT South Central Region,
Walla Walla Maintenance Shop

Maintenance Superintendent: Bob Martin
Maintenance Supervisor: Don Shute
Maintenance Tech II: Jeff Brodhead

Placing temporary signage adjacent to guardrails is often difficult: signs placed behind the guardrail may become obscured or lean over, while signs placed on the roadway side of the guardrail tend to encroach upon the traveled way. In windy weather, adding extra weight to the sign base made the task more difficult and hazardous.

Jeff Brodhead designed and built a sign support bracket that attaches to the guardrail and holds the sign above the rail. It makes sign installation easy, provides full visibility of the signs, does not encroach into the roadway, and withstands high wind conditions. Their bracket has become the tool of choice for temporary sign installations in guardrail sections.



Bob Martin and Jeff Brodhead.

They just slide it on and lock it down. Installation is complete in less than a minute. The bracket weighs less than 5 lbs. and requires no sand bags to hold it in place, which saves time and effort, and improves safety. Its compact size stores easily in any vehicle.



Guardrail Sign Mount was voted the best tool.

They built it out of scrap materials using shop resources, and estimate purchased materials would cost less than \$100.

For more information, contact Jeff Brodhead, WSDOT South Central Region, Walla Walla, Washington, at (509)-527-4548.

Asphalt Patching “Two Boot” Grader Attachment Best Mousetrap Published in the WST2 Newsletter in Year 2003

Issue 78, Spring 2003, page 26

WSDOT Olympic Region, Shelton Maintenance Facility

Maintenance Superintendent: Don Clotfelter

Maintenance Supervisor: Larry Deemer

Inventor and Fabricators: Tim Van Berkom, Aaron Corliss, and Eric Hembury

Asphalt patching is usually done manually by five- to six-man crews shoveling hot mix and raking it. It is a slow, backbreaking process.

Tim Van Berkom designed and constructed the Asphalt Patching Grader Attachment with help from co-workers Aaron Corliss and Eric Hembury for patching potholes, trenches, and ruts. Two “boots” slide on a pipe attached horizontally to a road grader’s moldboard blade, so the width is adjustable for patching. They can be rotated upward out of the way when the full grader blade is needed. They bolted brackets on the far left and right backside of the grader blade. The brackets protrude forward of the grader blade, and hold the ends of the pipe, from which the “boots” are suspended.

Using their grader attachment, the men have realized a savings in time and manpower. Only three people are needed on the crew now, and minimal manual labor is required, thus reducing the number of back injuries as well as man-hours. Other benefits include smoother patches, lower labor costs, and a more efficient operation, because they can move along three times faster than before. The attachment saves about \$1,400 per day.

For more information, contact Larry Deemer, WSDOT Shelton, Washington, at (360) 427-2110.



Aaron Corliss, Tim Van Berkom, and Larry Deemer.



Asphalt Patching Grader Attachment the best mousetrap published in the WST2 newsletter during the year 2003.

Mousetrap Registration

Name of Invention: _____

Agency: _____ (WSDOT) Region: _____

Mailing Address: _____

City: _____ State _____ Zip+4: _____

Contact Person: _____

E-mail Address: _____

Phone: () _____ Fax: () _____

Inventor(s)/Fabricator(s): _____

E-mail Address: _____

Phone: () _____ Fax: () _____

Supervisor's Name: _____

What prompted this invention (or equipment modification)?

How was it developed?

Labor, Equipment, Materials Used (from scrap pile? Did you purchase any parts?:

Cost Estimate (a rough guess will do):

Benefits to your operations:

Include sketches or plans of your "Better Mousetrap" with dimensions and materials identified, and photographs of the item from all angles (front, top, side, etc.) with the inventors in the photo if possible, to:

Build a Better Mousetrap
WSDOT-WST2 Center
PO Box 47390
Olympia, WA 98504-7390

For more information and photos of Mousetraps and Expo, check the Washington State T2 Center's web page:
www.wsdot.wa.gov/TA/T2Center/t2hp.htm
or contact Wendy Schmidt at (360) 705-7386 for details.

You can now register your Mousetrap online at: <http://fmapps.wsdot.wa.gov/mousetraps/Register.htm>

Median Crossover Accident Analysis and The Effectiveness of Median Barriers

This research explored the use of analytical models to evaluate factors associated with median accidents occurring on Washington highways. The study looked at roadway geometry, median widths, weather, and traffic volume factors to determine their relationship to median crossover accidents.

WSDOT Design Office and UW Study Placement of Median Barriers

This research produced several products. First, a roadside data system was developed for use in evaluating roadways with medians across the State of Washington. Secondly, a decision making tool was created that includes a set of criteria for the placement of median barriers. Finally, the effects of barrier placement in median crossover accidents were assessed.

Results of the study suggest that the factors evaluated do have significance in predicting median accident experience. The study recommends consideration of barriers in all medians less than fifty feet in width. Barriers are not recommended for medians wider than sixty feet. Case-by-case assessments should be made for medians in the 50-foot to 60-foot range.

This study validates current WSDOT placement of median barriers on Washington roadways.

How Can Local Agencies Use This Information

Local agency project designers may also benefit from this information and use it as guidance in the placement of median barriers on local roadways. It will be of value particularly in locations where the median width alone does not lead to a clear decision on barrier installation.

Technical Contact Information

For more information on this research or how it is being used to assess the placement in roadway medians, contact Dave Olson in the WSDOT Design Office at (360) 705-7952 or e-mail: olsonda@wsdot.wa.gov

For a copy of the research report, contact Sarah Smith in the WSDOT Research Office at (360) 705-7971 or e-mail: smithsa@wsdot.wa.gov

Study Authors

The researchers at the University of Washington were Venky Shankar, Songrit Chayanan, Sittipan Sittkariya, Ming-Bang Shyu, Gudmundur Ulfarsson, and Naveen Kumar Juvva. Technical engineering staff in the WSDOT Design Office who advised on technical aspects of the project were Dick Albin, Dave Olson, and John Milton. The project managers in the WSDOT Research Office were Kathy Lindquist and Rhonda Brooks.



Words from the Chair

*By Bill Whitcomb, Chairman, NWPMA
City of Vancouver, Washington*



By the time you read these words, our Fall Pavement Management Conference will have just wrapped up and a new chair will be elected to lead the organization into 2005. It has been a pleasure to have served as your chair for the past two years. While not naming names (as I am sure I would leave someone out inadvertently), I would like to say "Thank You" to all of those who have given so much to make this organization successful.

The challenge to pavement managers continues: to expend the dollars devoted to pavement maintenance and rehabilitation in a objective, cost-effective manner providing services of value to our constituents. As shown in our charter, we are a nonprofit association of professional and technical agencies and persons, both public and private, with interests and responsibilities in the systematic preservation and restoration of public road and street pavements. Our purpose is four fold:

1. To foster mutual and beneficial relationships between and among members and with other allied agencies, institutions, organizations, and business firms.
2. To improve the ability of members to effectively and efficiently manage their pavement preservation and restoration programs.
3. To promote pavement management technology transfer, research, and education.
4. To provide a common forum for the open exchange of ideas related to the development, enhancement, implementation, maintenance and operation of effective pavement systems.

The organization has the following goals:

1. To encourage the continued development and improvement of pavement management techniques and application. These include, but are not limited to, determination and evaluation of pavement distresses, structural condition determinations, rehabilitation methodologies, project level and network level analyses, and the application of microcomputer technology.
2. To promote universality in the application of pavement management technology such that there is comparability and common definition of pavement condition and evaluation.

Next year, there will be much to do. We will be continuing our successful spring and fall conferences. The Spring Conference will be March 15 and 16 at the Red Lion River Inn in Spokane, Washington. By the time this is published, we should have the venue set for the Fall Conference as well.

Our technical committee on calculating index values from visual condition survey information needs to finish its work and make recommendations to the membership. Other areas where the organization could provide additional information includes new construction materials and techniques, analysis techniques, integration with other parts of our organizations, and advances in technology. Finally, the real strength of the organization lies in the expertise of its members and their willingness to share this expertise with others. It is so encouraging to see this continuing into the future.

Finally, best of luck to our new chair. I look forward to continuing to be an active member in the organization and providing whatever support I can.

See you at the Spring Conference in March. Check on our NWPMA website for the most up-to-date information at <http://www.wsdot.wa.gov/TA/T2Center/Mgt.Systems/PavementTechnology/nwpma.html>



News from FHWA Washington Division

By Liana Liu, P.E., Traffic/Safety/Research/T2 Engineer,
FHWA Washington Division

FHWA's Press Release

- DOT Announces New Initiative for Loan and Credit Programs

Website: <http://www.fhwa.dot.gov/pressroom/fhwa0410.htm>

- Federal Highway Administrator and ARC Co-Chair Tour Blennerhassett Island Bridge Project, Highlight Plans to Speed Construction and Reduce Cost

Website: <http://www.fhwa.dot.gov/pressroom/fhwa0409.htm>

FHWA Publications

- FHWA-HRT-04-085 "An Examination of Fault, Unsafe Driving Acts, and Total Harm in Car-Truck Collisions"

Website: <http://www.tfhrc.gov/safety/hsis/pubs/04085/04085.pdf>

- FHWA-HRT-04-091 "A Review of the Signalized Intersections: Informational Guide"

Website: <http://www.tfhrc.gov/safety/pubs/04091/index.htm>

- FHWA-HRT-04-093 "Critical Literature Review of High-Performance Corrosion Reinforcements in Concrete Bridge Applications"

Website: <http://www.tfhrc.gov/structur/pubs/04093/04093.pdf>

- FHWA-RD-01-166 "Structural Factors for Flexible Pavements—Initial Evaluation of the SPS-1 Experiment"

Website: <http://www.tfhrc.gov/pavement/ltppl/reports/01166/01116.pdf>

Updated Road Safety Audit Website

FHWA, in cooperation with ITE, has recently updated the Road Safety Audit website. New documents have been added to the library, new content has been added to the home page, and a new benefits and legal sections have been created. Anyone wishing to contribute additional new content to this website should e-mail Louisa Ward at Louisa.Ward@fhwa.dot.gov.

Website: www.roadwaysafetyaudits.org

AASHTO Strategic Highway Safety Plan

Three new Implementation Guides have been published and distributed. These Guides are part of the implementation of the AASHTO Strategic Highway Safety Plan and achieving a national fatality rate of 1.0 death per 100 million VMT (vehicle miles traveled) by 2008. A bi-monthly newsletter, Lifelines, on the implementation of the AASHTO Strategic Highway Safety Plan is available.

Website: <http://safety.transportation.org>

No Passing Zones — Capturing the Most Difficult and Elusive of Data Elements

By Roger Chappell, Technology Integration Engineer, Washington State Department of Transportation Highways & Local Programs WST2 Center

There are many different types of data collection systems and techniques, but the hardest data that I have found to capture is called "decision sight distance." At times, it requires the skills of a big game hunter to bag this data element. It is relatively easy to capture data such as bridges, guardrails, signage, and striping because all these data elements are stationary. Decision sight distance can be described as tracking a target that is moving through a multi-dimensional world at speeds of up to 50 mph as it dodges in and out of obscurity. Sometimes, it can be quite a challenge to keep up the chase. We utilize this data element on a daily basis without knowing anything about it. Every time we choose to pass or not pass another vehicle, decision sight distance plays a part in that decision-making process.

For example, when you look down the road to see if you can perform a passing maneuver, your brain quickly assesses the situation. Based on the available information, you make a decision. The time it takes for most drivers to maneuver into an opposing lane and to make a decision to abort the maneuver and then return safely to their lane of travel has been observed, measured, and values assigned in less than one-second increments.



Washington State Department of Transportation, Transportation Data Office, Sight Distance Survey.

Each step of the passing process has been identified, quantified, and formulated into charts and graphs.

Before going on to the capture of this elusive data element, more information can be found at:

- AASHTO (American Association of State Highway Transportation Officials) Publication: "A policy on geometric design of highways and streets."

This publication provides detailed information on how Stopping and Decision Sight Distance are calculated, and is a must read for anyone tasked with the job of engineering no-passing zones.

- FHWA (U.S. Department of Transportation Federal Highway Administration) Publication the MUTCD (Manual on Uniform Traffic Control Devices) <http://mutcd.fhwa.dot.gov/>

This manual provides practical guidance for striping requirements for No-Passing Zones.

Your agency may also have a roadway design manual that contains information about your specific agency's local policies. These documents will also explain how to effectively communicate no-passing information to the motoring public through signage and pavement markings.

I have heard of and seen various attempts at accomplishing sight distance data capture; some are better than others. Though I have never seen this attempted and don't recommend it, I've heard of an agency that tied a rope between two vehicles and would shorten or lengthen it depending on the speed limit. When the target on the front vehicle would go out of sight, they would stop and a person in the following vehicle would jump out and paint a mark on the pavement. They would then continue until the target reappeared, then

a person in the following vehicle would jump out and paint another mark on the pavement. The area between the marks is known as obstructed sight distance. The rope method may work fine on a fairly straight roadway, but I think that you may have some difficulty with it rubbing on sight distance obstacles. Obstructions to sight distance can be vertical and horizontal. When the target goes over a hill, the obstruction is vertical. When it goes around a curve, you have a horizontal obstruction.

I know of agencies that employ surveying techniques and equipment, which though they are accurate, are time consuming and expensive. It is also possible to use GPS, laser range finder, and a target, but again this can be time consuming and expensive. If you are only checking sight distance for a small alignment project, either method should produce reliable results. Both of these methods require a crew walking through the project and constantly monitoring the sight distance variables between the instrument and the target, and recording locations where less than minimum conditions begin and end. Using these methodologies it is difficult to accomplish more than a couple of miles per day. I know of agencies that have worked out methodologies using two vehicles equipped with DMIs (Distance Measuring Instruments). In this technique, both vehicles start with their bumpers stopped over a known point. Next, the lead vehicle (target vehicle) is driven forward the desired distance. For example, in a rural speed zone of 55 mph, the target vehicle would drive 900 feet and stop. The chase vehicle would then change its DMI to reflect the location of the target vehicle. By matching the DMI readings and still physically maintaining the 900 feet of separation, the DMI

act like a virtual rope between the two vehicles. By using radios, the crews would then maintain the separation between vehicles in much the same way as using the rope method. This method is time consuming and expensive when attempting a large sight distance survey project. Using this methodology, their crews are able to survey about five miles per day.

This brings us to the big game hunters of sight distance data. This technique requires trained crews with automated equipment. The yields can be between 50 and 100 miles per day, depending on conditions. The WSDOT Transportation Data Office (TDO) is one of the few agencies in the Northwest that are able to accomplish this level of performance.

After using several systems purchased from vendors, and experiencing varying degrees of success, TDO built their own system. Their first system, built in the early 1990s, consisted of two vehicles with DMIs, 286 laptops, and wireless modems. This was wireless in the days before wireless standards like 802.11 ever existed and 286 laptops cost over \$5,000 each and weighed about 25 lbs. Here is a simplified version of how it worked, starting with the target or lead vehicle and working our way through the system.

The DMI in the lead vehicle outputs the distance traveled to the computer. The computer outputs the mileage information to the modem, and the modem broadcasts this mileage data in packets to the tracking vehicle. The modem in the tracking vehicle receives and validates the data packets and passes them on to the computer. The computer in the tracking vehicle compares the mileage from the target vehicle with the mileage from the tracking vehicle's DMI

and displays the current mileage and distance of separation in feet. The distance of separation between the two vehicles is displayed for the tracking vehicle driver, who maintains the appropriate feet of separation between the two vehicles based on the current speed limit information. In other words, the tracking vehicle driver keeps the virtual rope tight. This operation requires a three-person crew: one person to drive the target vehicle, one to maintain vehicle separation, and one to track the target. The computer operator in the tracking vehicle keeps his eyes on the target. When the sight distance to the target becomes obscured, the operator depresses a key to begin a no-passing zone. When the target once again meets minimum visual standards, he depresses another key to mark the end of the no-passing zone. When the speed limit changes, the new speed limit is entered and the driver adjusts his separation from the target vehicle.

This is the basics of how to track the sight distance of an object as it moves through multidimensional space. Someday we may be able to use Lidar (spatially accurate three-dimensional roadway models and automated path tracking software), but until then sight distance still remains one of the most difficult and elusive data elements to capture.

For current information and a good resource on sight distance surveying, contact the Washington State Department of Transportation, Transportation Data Office, Lou Baker, 360-570-2361, or on the web at <http://www.wsdot.wa.gov/mapsdata/tldo/rangetracking.htm>.

WST2 Resources

Free Publications from Your WST2 Center

For State of Washington residents only due to high mailing costs.

Name	Agency		
Mailing Address	City	State	Zip+4
Phone	Fax	E-mail	

Order direct from the WSDOT home page:

<http://www.wsdot.wa.gov/TA/T2Center/T2PUBS.htm>

Or you may fax the form to (360) 705-6858; or mail the form to WST2/WSDOT, H&LP, P.O. Box 47390, Olympia, WA 98504-7390; or e-mail your request to WST2Center@wsdot.wa.gov; or phone (360) 705-7386.

☒ Check the items you would like to order.

Hard Copy Publications

- ☐ Accessible Sidewalks and Street Crossings, FHWA, 2003
- ☐ Asset Management Primer, FHWA, 1999
- ☐ Concrete PASER Manual, University of Wisconsin, 1998
- ☐ Data Integration Primer, FHWA, 2001
- ☐ Designing Sidewalks and Trails for Access, Part 2, FHWA, 2001
- ☐ Dust Control on Low Volume Roads, FHWA, 2001
- ☐ Field Guide for Unpaved Rural Roads, Wyoming T2 Center, 1997
- ☐ Fish Passage Through Culverts, FHWA, USDA, 1998
- ☐ General Field Reference Guide (Pocket Size), 2002
- ☐ Geotextile Selection and Installation Manual for Rural Unpaved Roads, FHWA, 1989
- ☐ A Guide for Erecting Mailboxes on Highways, AASHTO, 1984
- ☐ HMA Pavement Smoothness, FHWA, 2002
- ☐ Improving Conditions for Bicycling and Walking, FHWA, 1998
- ☐ Improving Highway Safety at Bridges on Local Roads and Streets, FHWA, 1998
- ☐ Maintenance of Aggregate and Earth Roads, WST2 Center (1994 reprint)
- ☐ Pavement Preservation Checklist, FHWA, six pocket guides
- ☐ Recommendations to Reduce Pedestrian Collisions, WSDOT, December 1999
- ☐ Redevelopment for Livable Communities, Rhys Roth, Energy Outreach Center, 1995
- ☐ Reflective Sheeting Identification Guide, FHWA, 2001
- ☐ Scenic Byways Map of Washington State, 2003
- ☐ School Administrator's Guide to School Walk Routes and Student Pedestrian Safety, Washington Traffic Safety Commission and WSDOT, 2003
- ☐ State-of-the-Art Survey of Flexible Pavement Crack Sealing Procedures in the United States, CRREL, 1992
- ☐ Traffic Control Handbook for Mobile Operations at Night, FHWA, 2003
- ☐ Trail Construction & Maintenance Notebook, USDA Forest Service, 2000
- ☐ Utility Cuts in Paved Roads, Field Guide, FHWA, 1997
- ☐ W-Beam Guardrail Repair and Maintenance, FHWA, 1996

- ☐ A Walkable Community is More Than Just Sidewalks, FHWA, 2000
- ☐ Washington Bicycle Map, WSDOT, 2001
- ☐ Wetland Trail Design and Construction, USDA, 2001
- ☐ Wildlife Habitat Connectivity Across European Highways, FHWA, 2002

Workbooks and Handouts from WST2 Center Workshops

- ☐ Application of Geographic Information Systems for Transportation, FHWA, 1999
- ☐ Construction Documentation: Construction Training Manual for Local Agencies, WSDOT, 2003
- ☐ Environmental Overview, *LAG Manual* Chapter 24, WSDOT, 2004

Videotapes

- ☐ Driving Modern Roundabouts, City of Lacey, City of Olympia, and WSDOT, 2002
- ☐ Pacific Northwest Transportation Technology Expo and Mousetraps

CD ROM

- ☐ H&LP CD Library (formerly WST2 CD Library), 6th Edition, Summer 2004 contains the following publications and many other technical documents:
 - Asphalt Pavement Repair Manuals of Practice, SHRP, 1993
 - Asphalt Seal Coats, WSDOT/WST2 Revised 2003
 - Building Projects that Build Communities, Community Partnership Forum, 2003
 - Concrete Pavement Repair Manuals of Practice, SHRP, 1993
 - Dust Palliative Selection and Application Guide, USFS, 1992
 - Gravel Roads Maintenance and Design Manual, South Dakota LTAP, November 2000
 - A Guide for Local Agency Pavement Managers, NWT2 Center, 1994
 - Local Agency Pavement Management Application Guide, WST2 Center, 1997
 - Local Agency Safety Management System, WSDOT, 1998, Reprinted 2000

- Maintenance of Signs & Sign Supports for Local Roads and Streets, FHWA, 2001
- Manual of Practice for an Effective Anti-icing Program: A Guide for Highway Winter Maintenance Personnel, FHWA, 1996
- Pavement Surface Condition Field Rating Manual for Asphalt Pavement, NWPMA, WSDOT, 1999
- Roundabouts: An Information Guide, FHWA, 2000
- Streetwise, A Simplified Local Agency Pavement Management System, WSDOT, 2000

Some of the publications on the CD Library are still available in hard copy within Washington State only.

Other CDs

- Community Impact Assessment Subcommittee Workshop Proceedings, 2001
- Driving Modern Roundabouts, City of Lacey, City of Olympia and WSDOT, 2002
- Emergency Relief Training for Washington State Local Agencies, WSDOT, 2004
- Gravel Roads: Maintenance and Design Manual, FHWA, SD LTAP, 2000
- Pedestrian Facilities Guidebook, WSDOT, 1997
- Safer Journey, FHWA, 2003 (Pedestrian)
- Tools for Identifying Land Use Areas with Potential for Pedestrian Travel and Prioritizing Investments, UW/WSDOT, 2001
- WSDOT Engineering Publications CD Library, March 2004

DVD

- Driving Modern Roundabouts, City of Lacey, City of Olympia and WSDOT, 2002

Non-Credit Self-Study Guides

These non-credit WSDOT self-study guides may be obtained from the WST2 Center. An invoice will be sent with the books.

- Basic Surveying, \$20
- Advanced Surveying (metric), \$20
- Contract Plans Reading, \$25
- Technical Mathematics I, \$20
- Technical Mathematics II, \$20
- Basic Metric System, \$20



Online Resources

Bridge

- WSDOT Highways & Local Programs
<http://www.wsdot.wa.gov/TA/Operations/BRIDGE/BRIDGEHP.HTM>

Environmental

- *Environmental Procedures Manual* (M31-11)
<http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/EPM/EPM.htm>
- Regional Road Maintenance Endangered Species Act Program Guidelines
<http://www.metrokc.gov/roadcon/bmp/pdfguide.htm>
- National Marine Fisheries Service Species Listings & Info
<http://www.nwr.noaa.gov/>
- U.S. Fish and Wildlife Service Species Listings & Info
<http://endangered.fws.gov/>
- Washington State DNR's Natural Heritage Program Home Page
<http://www.wa.gov/dnr/htdocs/fr/nhp/refdesk/fsrefix.htm>
- FHWA's Environmental Home Page
<http://www.fhwa.dot.gov/environment/index.htm>

Highways & Local Programs List Serves

For the following list serves:

- WST2 Newsletter
- WST2 Training
- Traffic Technology and Safety

Use the following address to sign up:

<http://www.wsdot.wa.gov/TA/T2Center/T2hp.htm>

WSDOT Materials Lab

- <http://www.wsdot.wa.gov/biz/mats>

Infrastructure Management & GIS/GPS

The site below has been established to promote interagency data exchange and resources sharing between local governmental agencies.

<http://www.wsdot.wa.gov/TA/T2Center/Mgt.Systems/InfrastructureTechnology/InfThp.html>

Legal Search

- Search RCWs and WACs
<http://search.leg.wa.gov/pub/textsearch/default.asp>

Local Agency Guidelines (LAG) Manual

- <http://www.wsdot.wa.gov/TA/Operations/LAG/LAGHP.htm>

Pavement Management

- Pavement Publications & NWPMA Links
<http://www.wsdot.wa.gov/TA/T2Center/Mgt.Systems/PavementTechnology>
- NWPMA – North West Pavement Management Association
<http://www.wsdot.wa.gov/TA/T2Center/Mgt.Systems/PavementTechnology/nwpma.html>
- Asphalt Institute
<http://www.asphaltinstitute.org/>
- National Asphalt Pavement Association
<http://www.hotmix.org/>
- Pavement (A Website for Managing Pavements)
<http://www.mincad.com.au/pavenet>
- SuperPave Information
<http://www.utexas.edu/research/superpave>

Project Development

- Federal Aid Progress Billing Form
<http://www.wsdot.wa.gov/TA/ProgMgt/Projectinfo/BILLFORM.XLS>
- State Funded Progress Billing Form
<http://www.wsdot.wa.gov/TA/ProgMgt/Projectinfo/BILLFORMSTATE.xls>
- STIP (State Transportation Improvement Program)
<http://www.wsdot.wa.gov/TA/ProgMgt/STIP/STIPHP.htm>

- TIP (Local Agency 6-Year Transportation Improvement Program)
<http://www.wsdot.wa.gov/TA/ProgMgt/STIP/TIP.html>

Research

- WSDOT Research Office
<http://www.wsdot.wa.gov/research>
- Looking for a Transportation Research Publication?
<http://gulliver.trb.org>
- Municipal Research and Services Center of Washington
<http://www.mrsc.org>

Traffic & Safety

- Safety Management Publications & Information
<http://www.wsdot.wa.gov/TA/T2Center/Mgt.Systems/SafetyTechnology/>
- WSDOT Traffic Data Office
<http://www.wsdot.wa.gov/mapsdata/tdo/>
- Washington State Patrol
<http://www.wsp.wa.gov>
- Washington Traffic Safety Commission
<http://www.wtsc.wa.gov>
- National Highway Traffic Safety Administration
<http://www.nhtsa.dot.gov>
- American Traffic Safety Services Association
<http://www.atssa.com>
- Municipal Research and Services Center of Washington
<http://www.mrsc.org>
- Transportation Research Board
<http://gulliver.trb.org>

Training

- WST2 Classes
<http://www.wsdot.wa.gov/TA/T2Center/Training/>
- WST2 Class Registration
http://fmapps.wsdot.wa.gov/tbase_registration/
- County Road Administration Board
<http://www.crab.wa.gov/>
- American Public Works Association
<http://www.apwa.net/education>
- Transportation Partnership in Engineering Education Development (TRANSPED)
<http://www.engr.washington.edu/epp>

WSDOT Local Programs Engineers

- Eastern Region (Spokane)
Keith Martin, (509) 324-6080,
martink@wsdot.wa.gov
- Northwest Region (Seattle)
Ed Conyers, (206) 440-4734,
conyere@wsdot.wa.gov
- Olympic Region (Olympia)
Neal Campbell, (360) 357-2666,
campben@wsdot.wa.gov
- North Central Region (Wenatchee)
Paul Mahre, (509) 667-3090 or 667-2900,
mahrep@wsdot.wa.gov
- South Central Region (Yakima)
Roger Arms, (509) 577-1780,
armsr@wsdot.wa.gov
- Southwest Region (Vancouver)
Bill Pierce, (360) 905-2215,
pierceb@wsdot.wa.gov

Other Online Resources

- Bicycle maps and other information
<http://www.wsdot.wa.gov/bike/>
- Pedestrian information
<http://www.wsdot.wa.gov/walk/>
- Rural Partnerships and scenic byways information
<http://www.wsdot.wa.gov/TA/progmgt/byways/>
- Better Mousetraps
<http://www.wsdot.wa.gov/ta/T2Center/Mousetraps/>
- Retired Professional Program
<http://www.wsdot.wa.gov/TA/T2Center/Retired.htm>
- Student Referral Program
<http://www.wsdot.wa.gov/TA/T2Center/StudentReferral/>
- LTAP (Local Technical Assistance Program) Clearing House
<http://www.ltapt2.org>
- Institute of Transportation Engineers
<http://www.ite.org>
- Washington State Counties
<http://mrsc.org/byndmrsc/counties.aspx>
- Washington State Cities and Towns
<http://mrsc.org/byndmrsc/cities.aspx>
- Governor's Office of Indian Affairs
<http://www.goia.wa.gov>
- Southwest Interagency Coop - Grounds Equipment Maintenance (GEM)
<http://www.gematwork.org>

Washington State T2 Center

Contact: Laurel Gray (360) 705-7355
Wendy Schmidt (360) 705-7386
<http://www.wsdot.wa.gov/TA/T2Center/Training>

To register for a class in this section, use the contact listed above.

The class fees shown apply to both public and private sector students. Classes marked with an asterisk (*) qualify under the Road and Street Management Training Program as a requirement or an elective and contribute to a Certificate of Achievement (CA) in Road and Street Management. On-line registrations are now being accepted for the following classes. Further information on these courses, and the link to the on-line registration form, can be obtained from the web page listed above.

Environmental Overview for Local Agencies*

November 3, Richland. Free. Instructors: John Heinley, Trevin Taylor and Brian Hasselbach, Highways & Local Programs Environmental Staff. This course will give a basic understanding of the National Environmental Policy Act (NEPA) and other environmental procedures — what the requirements are, when they apply, and how to properly fill out the paperwork. Specific topics will include: the Endangered Species Act's Section 7 consultations — formal and informal; Memorandums of Agreement for Adverse Cultural/Historical Effects; the Section 106 process — including exemptions; Tribal Relations and Traditional Cultural Properties; Section 4(f) Evaluations; guidance on air quality, noise impacts, and environmental justice discipline reports; and a general discussion regarding the process and documentation requirements of Environmental Assessments and Environmental Impact Statements.

Making Effective Presentations*

November 4, Tacoma. \$85. Instructor: Tom Peterson, Bates Technical College. This workshop will give you practice in developing your communication skills and presenting your ideas clearly, confidently and persuasively. Participants will learn how to select, plan, and prepare topics for presentation to a group in a business setting; present two to three topics during the duration of the workshop, using the structure and techniques taught in the workshop; and evaluate the effectiveness of presentations by applying elements of constructive critique.

Designing Accessible Pedestrian Facilities

November 4-5, Shoreline; November 8-9, Tumwater. \$100. Instructor: Ida van Schalkwyk, University of Arizona. The provision of accessible pedestrian facilities is mandated by the Federal Americans with Disabilities Act. This course provides a solid background on many aspects of the Americans with Disabilities Act and its interpretation by the Access Board and the courts. The course covers the characteristics of pedestrians, people with disabilities, legal requirements, policies and funding opportunities and focuses on accessible pedestrian design.

Contract Specification Writing (LAG Program)

November 9, Tumwater. \$50. Instructor: Steve Boesel. This class will provide guidance and methods for writing consistently clear, concise, complete and well formatted contract special provisions. It will provide a thought process that can be used when writing or reviewing contract specifications to ensure the greatest possibility for a successful bid and a successful construction project.

Context Sensitive Solutions

November 9-10, Lacey; December 8-9, Wenatchee; January 4-5, Spokane; January 26-27, Vancouver; March 1-2, Yakima. Free. Instructors: CH2MHill and WSDOT. This course will provide the knowledge and skills to collaboratively develop transportation projects addressing the needs of a broad range of users and interested parties. Participants will learn to identify critical issues, involve stakeholders, evaluate alternatives and minimize tort liability when developing solutions to transportation issues that are specific to individual sites.

Purchasing, Bidding and Contract Management for Local Agencies

November 16, Vancouver; December 14, Lacey. \$50. Instructors: John Carpita, Municipal Research & Services Center of Washington; Nancy Woods, City of Lynnwood Purchasing Manager; and Dick Andrews, Perteet, Inc. Topics to be discussed:

- Purchasing and bidding overview — statutes that affect local agencies in purchasing goods, materials and services.
- Procurement issues, policies and procedures
- Public works contracting — procedures, checklists, files; contract documents; bidding and contract award issues; contract administration and closeout; retainage and bonding; sales and use tax issues;

exemptions; small works projects; emergency contracts; prevailing wage issues; contractor licensing, bond and insurance requirements.

- Consultant selection — types of consultants; quality based selection vs. bids; selection process; contract negotiations.

Real Estate Acquisition Process for FHWA-Funded Projects by Local Agencies

November 16-18, Shoreline. \$100. Instructors: FHWA and WSDOT Real Estate Office. This course will cover the basic aspects of the right of way acquisition process including FHWA requirements, local agency policies and procedures, scoping, appraisal, appraisal review, title, acquisition, relocation, and certification. This course has been developed specifically for local agencies and consultants acquiring right of way for local agencies. It will include all stages of the process with examples and case studies.

Troubleshooting Roundabout Design

November 22, Shoreline; November 29, Lacey. \$100. Instructors: Patrick McGrady and Michelle Mach, Reid Middleton, Inc. Students will participate in hands-on roundabout design. Exercises include site specific conditions that influence the choice of roundabout control. Students will troubleshoot roundabout designs to identify and remove fatal flaws and refine the design for safe efficient traffic operations. The instructors will show how to establish a balance between design elements and avoid common pitfalls in single and multi-lane roundabout design.

Writing Skills*

November 22-23, Shoreline. \$110. Instructor: Jordan Peabody. A two-day workshop designed to reduce the confusion caused by the poorly written word. Anyone who must write on the job, but is not a writing pro, will find the training both pleasant and helpful. Writing techniques apply to: letters, manuals, speeches, memos, newsletters, e-mail, proposals, reports, bulletins and minutes.

Access Management, Location & Design

November 30 – December 2, Shoreline. \$400. This is a National Highway Institute class. The course covers access management along streets and highways. General benefits, as well as the social, economic, political and legal implications of access control are examined. Existing access management practices and policies from states and jurisdictions are used as examples of what types of programs have been implemented and how effective they have been. Through in-depth discussion, access management techniques and the warrants for their use are reviewed. Guidelines for design and application of these access management techniques are described in detail. Strategies for developing and implementing retrofit programs to improve existing access control are presented.

Construction Documentation

December 7, Wenatchee; January 11, Bellingham; January 12, Shoreline; February 2, Vancouver; February 15, Port Angeles; February 16, Tacoma; March 15, east Seattle; March 16, south Seattle; October 25, Spokane; December 13, Shoreline; December 14, south Seattle. Free. Instructor: Ken Hash, WSDOT SW Region Engineer. Regional Local Program Engineers will be in attendance at each class to answer questions. This course covers three phases: pre-contract, contract, and post-contract documentation of public works projects with FHWA funding. Local agency and contractor's documentation is discussed, with a strong emphasis on the documentation requirements of the field inspector. On completion of this course, participants will have a working knowledge of: (1) required documentation that will be submitted by the contractor, (2) required documentation for acceptance of contract materials, (3) daily inspector's documentation of the contract work, and (4) source documentation for the monthly progress payment to the contractor.

Pavement Marking Technician Training

January 25-26, 2005, Shoreline. \$450. Instructor: American Traffic Safety Services Association (ATSSA). This two-day course will greatly increase the knowledge and skills of agency personnel who are responsible for the selection, design, installation, and inspection of pavement markings. Comprehensive instruction in the methods of applying traffic control design, specifically for pavement marking installation, and the procedures to follow that provide for a safe and efficient application process are reviewed. The materials covered include pavement marking standards and principles as contained in the Manual on Uniform Traffic Control Devices, EPA, DOT and OSHA regulations; personal and traffic control safety; installation and quality control of a variety of the most common pavement marking materials as well as discussion of more recently developed materials. Tort liability and various legal issues are discussed and will provide the student with a working knowledge of the procedures in documenting and complying with environmental and hazardous materials regulations. In addition, industry ethics and professionalism are reviewed and discussed in scenarios representing field situations and conditions.

Introduction to GPS Mapping Grade Equipment

\$325. This is a three-day, special-request class. Sessions can be scheduled in the WSDOT Tumwater training room, or scheduled in your agency. Fee is based on 4 students per session. Instructor: Max Schade. This is an introductory course on mapping grade GPS equipment and is taught by a Trimble-certified instructor. It is designed to provide basic knowledge and skills in the use of GPS technology in mission planning, data gathering, and data processing. The training will enable field operation personnel to use new methods and Trimble mapping grade equipment as well as understand problems encountered when using the GPS satellite constellation.

Scheduled for 2005

Pavement Condition Rating*

May 10-11, Ellensburg; May 24-25, Tacoma; September 13-14, Tacoma. Free

Implementing Superpave in Local Agencies*

Tentatively four sessions in spring. Tri-Cities, Wenatchee, Vancouver, Seattle. Free

Bridge Condition Inspection Update

February 1-2, Moses Lake; February 15-16, Lacey. Free

Bridge Condition Inspection Fundamentals

February 8-10, Lacey. Free to Washington State local agencies and consultants. All others \$150.

Bridge Condition Inspection Training

March 14-25, Lacey. Free to Washington State local agencies and consultants. All others \$700.

Basics of a Good Gravel Road*

April 19, Moses Lake.

Roadway Drainage*

April 21, Yakima; April 26, Kent; April 28, Vancouver. \$45

Tentative Schedule for 2006

Construction Documentation

January 10, Port Orchard; January 11, Tacoma; January 30, Vancouver; February 1, Olympia; February 14, Wenatchee; February 16, Kennewick; March 14, North Seattle; March 15, East Seattle. Free.

Winter Highway Maintenance for Snow and Ice

Several sessions east and west side.

Bridge Condition Inspection Update

Two sessions, Ellensburg and Lacey. Free.

Bridge Condition Inspection Fundamentals

One session, Lacey. Free to Washington State local agencies and consultants. All others \$150.

Bridge Condition Inspection Training

One session, Lacey. Free to Washington State local agencies and consultants. All others \$700.

Pavement Condition Rating

Three sessions, Ellensburg and Tacoma. Free.

The Endangered Species Act Training Program

Regional Road Maintenance ESA Training Program

The University of Washington's Transportation Professional Development Program continues to offer courses in the Regional Road Maintenance ESA Training Program in various locations in Washington State. This fall, Track 3F, a field course for road crews that focuses on erosion and sediment control BMPs is being offered in Bellingham, Longview/Kelso and Wenatchee.

This winter, Track 2, a two-day course for engineering and environmental staff and road maintenance managers and supervisors will be offered in several locations around Washington State, including eastern and central Washington. In the spring, additional Track 3F classes will be offered around the state. To assist the University in the scheduling of these courses, please contact the Program Coordinator Julie Smith or the Program Director Jim McManus (see below for phone and e-mail). If your agency is interested in hosting either a Track 2 or Track 3 course, the University will work with your agency to determine potential cost savings.

Information on the Regional Road Maintenance ESA Program and the guidelines can be viewed from this website: <http://www.metrokc.gov/kcdot/roads/esal/index.cfm>.

Course Descriptions

The Regional Road Maintenance ESA Training Program courses are as follows:

- **Track 1: Briefing for Regional Decision Makers**
2 hours. No fee. An overview of the ESA program for regional level management and administration. This is a stand-alone training class and not part of the required training program. It is offered by members of the Regional Road Maintenance Forum. Call Roy Harris or Gerry Crum at (425) 257-8800 for information. Information may also be obtained from Janine Johanson at METRO KC, (206) 205-7101.
- **Track 2: Introduction, Design and BMPs, Monitoring, and Environmental Roles for Engineering, Technical and Scientific Staff**
1.4 CEUs. \$225 for local agency employees in Washington State; \$400 for others. This two-day course is designed for engineering, biological and environmental staff, managers and crew supervisors and leads involved in field maintenance activities. The course provides an introduction to the program Guidelines, design, habitat, the ten program elements and maintenance BMPs to meet ESA requirements.

- **Track 3: Classroom Introduction to ESA and Outcome-based Road Maintenance for Field Crews**
0.7 CEUs. \$165 for local agency employees in Washington State; \$375 for others. This one-day course is appropriate for leads and field crew supervisors involved in maintenance activities. It provides an introduction to the program Guidelines, design, habitat, environmental roles, the ten program elements and implementation of maintenance BMPs to meet ESA requirements.
- **Track 3F: Road Maintenance Crew Training in the Field Environment: Applying Maintenance BMPs**
0.7 CEUs. \$125 for local agency employees in Washington State; \$175 for WSDOT employees. This one-day course is for maintenance supervisors, crew leads and crewmembers. This is the newest addition to the training program, and is conducted in a field setting. Teams of maintenance crews construct, test, and assess the effectiveness of a variety of erosion and sediment control BMPs. Participants have an opportunity to see multiple BMPs in use, apply installation information for each BMP category to capture, contain, reduce, or minimize flows to minimize or contain erosion and sediment at the site.
- **Track 4: Train-the-Trainer for the Regional Road Maintenance Program**
1.4 CEUs. \$240 for local agency employees in Washington State; \$375 for others. This two-day course has been designed specifically for agency-selected ESA trainers. It focuses on training skills and techniques, and evaluates, prepares, and certifies candidates to teach the Regional Road Maintenance Program classroom training (Tracks 2 and 3) and field demonstrations of BMP installations.

Program Information

The University of Washington's Transportation Professional Development Program in the Department of Civil and Environmental Engineering coordinates and presents the Regional Road Maintenance ESA Training Program in collaboration with the WSDOT T2 Center and the Regional Road Maintenance ESA Program Training Subcommittee. Questions regarding course content should be directed to Jim McManus, the Director of Professional Development, at (206) 543-3747 or jmcman@u.washington.edu.

For scheduling of classes, course registration or information on hosting a class at your agency, please contact the Program Coordinator, Julie Smith at (206) 543-5539, toll-free at (866) 791-1275 or by e-mail at jsmith@engr.washington.edu. Program and registration information can also be found at <http://www.engr.washington.edu/epl/esal/reginfo>.

TRANSPEED University of Washington

Contact: Christy Pack
(206) 543-5539, toll free 1-866-791-1275
fax (206) 543-2352
<http://www.engr.washington.edu/epp>

To register for a class in this section, use the contact listed above.

The prices in this section are for local agency / non-local agency.

Roundabout Design Concepts and Guidelines
November 3-5, Vancouver. \$420/\$605

Managing Consultants
November 4, Seattle. \$485/\$650

Introduction to Retaining Wall Type Selection and Layout
November 9, Vancouver. \$175/\$300

Public Works Construction Project Management
November 18-19, Seattle. Course revised with new instructor. \$370/\$520

Administering Consultant Contracts
November 30, Lacey. New Course. \$175/\$320

Rehabilitation of Pavements
December 1-3, Lacey. \$320/\$520

Work Zone Traffic Control Plan (TCP) Design
December 7-9, Seattle. \$370/\$570

Manual on Uniform Traffic Control Devices (MUTCD)
December 13-15, Seattle. \$320/\$520

Managing Environmental Impact for Design and Construction
January 5-6, Seattle. New Course. \$385/\$600

Measuring Project Performance
February 2, Seattle. New course with web-based component. \$470/\$675

Associated General Contractors Education Foundation

Contact: Beth Sachse
(206) 284-4500, fax (206) 284-4595
bsachse@agcwa.com
<http://www.constructionfoundation.org>

To register for a class in this section, use the contact listed above.

Construction Site Erosion and Sediment Control Certification

These WSDOT approved classes are presented by the AGC Education Foundation and available on the following dates:

November 9, Everett; November 19, Renton;
December 7, Bellingham; January 21, Seattle;
February 18, Tacoma; March 29, Everett; April 29, Seattle; May 27, Tacoma; June 28, Seattle.
Certification and recertification. \$225/\$250.

Other Training Programs for Local Agencies

Engineering Professional Programs (EPP)

University of Washington
(206) 543-5539
<http://www.engr.washington.edu/epp>

Professional Engineering Practice Liaison (PEPL)

University of Washington
(206) 543-5539
<http://www.engr.washington.edu/epp>

Washington Environmental Training Center

Green River Community College, Auburn
1-800-562-0858
<http://www.greenriver.edu/wetrc>

Click, Listen and Learn

American Public Works Association
(816) 472-6100
<http://www.apwa.net/education/cll/>

Washington State Emergency Management Division

(253) 512-7048 or (253) 512-7000
<http://emd.wa.gov/>

Washington State Department of Personnel (DOP)

Human Resource Development Services
(360) 664-1921
<http://hr.dop.wa.gov/training>

Evergreen Safety Council

(206) 382-4090 or 1-800-521-0778
<http://www.esc.org>

Infrastructure Assistance Coordinating Council (IACC)

"The Bucks Start Here"

November 1-4, 2004. Wenatchee Conference Center.

For more information, contact Bill Cole, Public Works Board, at (360) 586-4125.

Washington Asphalt Conference

November 4, 2004. Hyatt Regency Hotel, Bellevue.

For information, contact Tom Gaetz at (206) 284-8780 or tomgaetz@msn.com; John Duval at (503) 234-3935 or jduval@asphaltinstitute.org; or Cindy Josephson at cindyapaw@aol.com.

2004 Road and Street Maintenance Supervisor's School

December 8-10, 2004. DoubleTree Hotel, Bellevue.

For information, contact Michelle Johnson, Washington State University, at 1-800-942-4978.

APWA Washington State Chapter Conferences

April 12-15, 2005, Tacoma

October 4-7, 2005 Yakima

For information regarding either of these conferences, contact Dick McKinley at (360) 676-6961.

Road Builders' Clinic

March 1-3, 2005, Coeur d'Alene Resort, Coeur d'Alene, Idaho.

For information, contact Washington State University at 1-800-942-4978, or <http://capps.wsu.edu>.

Pacific Northwest Transportation Technology Expo

May 2006. Location and date to be determined.

AASHTO Roadside Design Guide, Web-based Training

NHI Course Number: 380032C

This web-based course is approximately 14 hours long and is available anytime – 24 hours, 365 days a year via the Internet. The cost for non-FHWA employees is \$230 per participant and includes a copy of the 2002 AASHTO "Roadside Design Guide." This course provides an overview of the 2002 AASHTO "Roadside Design Guide." Emphasis is on current highway agency policies and practices. Participants must register online at <http://www.nhi.fhwa.dot.gov/registerdl.asp>

Computer Requirements: You will need a fairly recent version of a browser (such as Internet Explorer 4 or 5 or Netscape 4 with JavaScript enabled), the latest version of Macromedia Shockwave and Flash (which you can download from the Internet), and a connection to the Internet (at least 56K modem). An older computer such as a Pentium 100 would work, but it would be slower than a Pentium III. For more information, visit <http://www.nhi.fhwa.dot.gov>

Tips on Team Motivation

Following are edited suggestions on how to motivate your employees that were provided at the "Motivating Your Team" workshop conducted as part of the Washington State Quality 2000 Conference.

Acknowledgement

- Saying, "thank you."
- Give praise.
- Write a quick personal note.
- A little chocolate and caffeine goes a long way.
- Have a great celebration.
- Appreciate publicly.
- Recognize efforts immediately.
- Give a free T-shirt.
- Have a picnic.
- Give consistent feedback.
- Make appreciation personal and meaningful.
- Post recognition letters on the bulletin board.
- Give recognition to others that you would like to receive yourself.
- Celebrate anniversaries within the agency.
- Provide acknowledgement in your newsletter.
- Give a friendly "good morning."
- Give support and backing to your employees.

Staff Inclusion

- Develop with your employees, a vision statement or theme that shows how your employees' work makes a difference. Publish the vision in your workplace.
- Have monthly "all-staff" meetings.
- Share information.
- Let employees see results.
- Ask for employee input.
- When you do meet with staff, be "present."
- Spend one-on-one time with employees.
- Give employees time to share concerns and rejoice.

Communicate

- Clarify expectations.
- Give open, honest communication.
- Listen.
- Give employees your full attention.
- Respond to questions promptly.
- Work in teams.

Find Out What Motivates Your Staff

- Match talents with jobs of the team.
- Discuss their careers with them.
- Be sincere about employees' well being.
- Make motivation personal.
- Look for opportunities to establish rapport.
- Walk around and get to know your employees.
- Trust what employees tell you about their needs.

Empowerment

- Let assistants manage something.
- Provide independence.
- Give employees tools to do their job and then give feedback.
- Provide a flexible, positive work environment.
- Trust your employees.
- Allow employees to build quality into their work.
- Provide training.

Start With Yourself

- You may need to get out of your comfort zone.
- Show your own enthusiasm and motivation for being there.
- Love the work you do.
- Believe in yourself and know that you have a purpose.

Trust

- Treat each employee fairly and equally.
- Respect and trust.

Fun

- Provide opportunities for laughter.



And who wouldn't like cornbread?

One of the goals of the H&LP WST2 newsletter is to be an electronic publication. You can receive the newsletter electronically by adding your e-mail address to the WST2 Newsletter Listserv at <http://www.wsdot.wa.gov/TA/T2Center/T2HP.htm>. You can also view the newsletters at the same web address beneath the heading "Publications & Software".

If you would like to stop receiving a hardcopy of the newsletter, please e-mail Wendy Schmidt at schmidw@wsdot.wa.gov, and ask to be taken off the hardcopy mailing list.



Sign of the Times

Do you have a humorous traffic sign to share? Send us a print or e-mail a digital image (preferably a 300 dpi, 1000x1500 dpi jpeg or tif) and we will add it to our collection for publishing. Please provide your name, title, agency or company, and a short description of where and when you saw the sign. We want to give you credit for your participation.

You can e-mail the image to schofil@wsdot.wa.gov

Or mail the photo to:
"Sign of the Times"
WST2 Center
PO Box 47390
Olympia, WA 98504-7390

Please don't send your original photo. Although we will do our best to return the photo, we can't guarantee it.



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